

Start-up Procedures for Unit Vent Controller with Free Cooling, Night Purge and Dehumidification — 0-10V Output

TEC 0535.11

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Unit Vent Controller with Free Cooling, Night Purge and Dehumidification — 0-10V Output

This document presents start-up procedures for the Unit Vent Controllers with Free Cooling, Night Purge and Dehumidification – 0-10V Output. Refer to Figure 1.

- NOTES:**
1. Update each controller at the field panel immediately after you have completed the controller start-up procedures, and have made all other changes to the controller's point database (including tuning, etc.).
 2. If free cooling is desired, then add an outside temperature point at the field panel. This field panel point needs to send its information to the TEC point OA TEMP (number 74).

Verify power to controller

Verify that the Controller is powered up. Check that the BST LED on the controller is flashing. If the BST LED does not flash ON/OFF once per second, then refer to the *APOGEE Automation Service Procedures Manual* (125-2013) for troubleshooting information.

NOTE: The Controller Interface Software (CIS) used with this application must be Rev. 2.0 or greater.

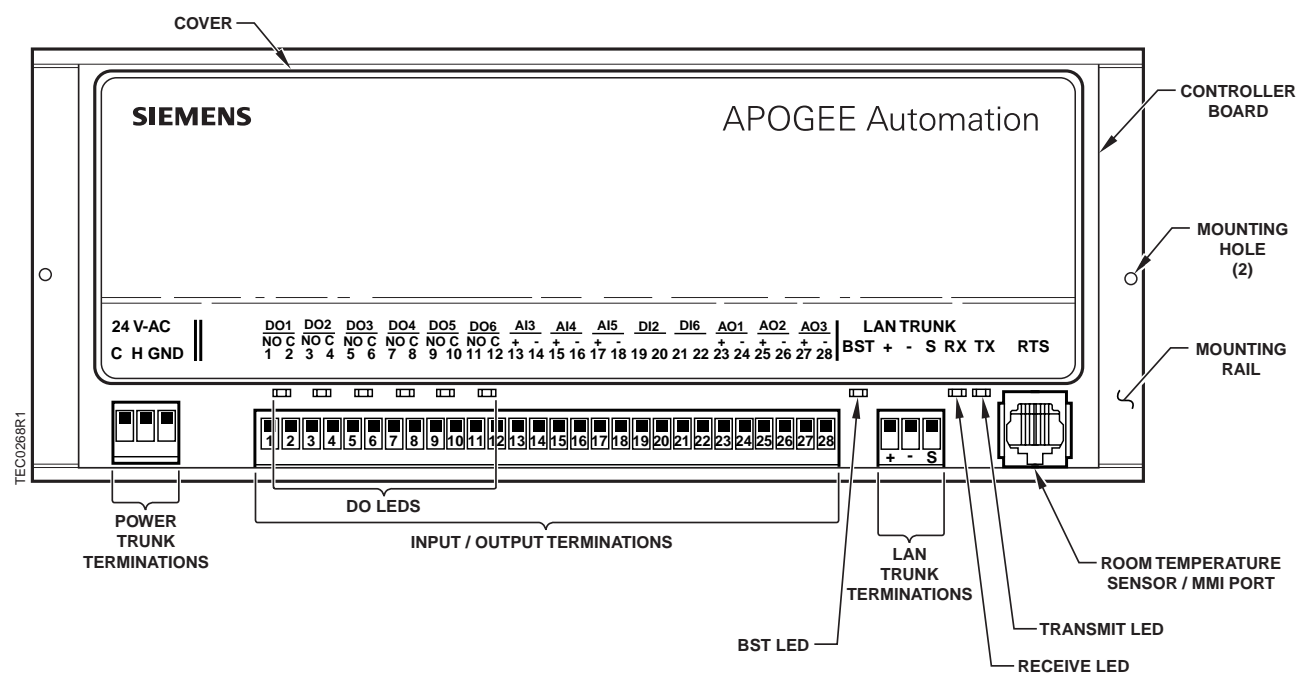


Figure 1. Unit Vent Controller with Free Cooling, Night Purge and Dehumidification – 0-10V Output.

Set controller address and application

Using the portable operator's terminal, set the controller address and application following these steps:

1. Verify that the point APPLICATION (number 2) is set to 2384 (slave mode).
2. Display the STARTUP report.
3. Set the point CTLR ADDRESS (number 1) to the appropriate address number.
4. Set the point APPLICATION (number 2) to the appropriate application. Refer to Table 1 for application names and numbers.

Table 1. Unit Vent Controller with Free Cooling, Night Purge and Dehumidification – 0-10V Output Applications.

Application	Revision UM10 or Higher
Unit Vent Controller with free cooling, night purge & dehumidification	2348
Unit Vent Controller with free cooling, night purge, dehumidification & analog HTG/CLG valve	2349
Slave Mode	2384

After you set the application, the controller will go through a shut-down/load sequence as it switches from slave mode to the application selected. After the application loads and the OVERVIEW report appears, change to the UECYC I.II report (if in application 2348) or the UECYC I.II report (if in application 2349) and continue with the following procedures.

NOTE: Unless otherwise stated, the following instructions apply to applications 2348 and 2349 **both**.

Enable closure of 2-position valve

If the unit has a face-bypass damper and 2-position valves, then set the point FBP.2PSVCTL (number 30) to ENABLE to allow the 2-position valve to close when the face-bypass damper is at the full bypass position. For all other units, leave FBP.2PSVCTL at its default position of DISABL.

Set DISABLE TEMP and ENABLE TEMP

When FBP.2PSVCTL is set to DISABL, the 2-position heating valve **will still close** when the face-bypass damper is at the full bypass position and **both** of the following conditions are in effect:

- It is the occupied heating mode.
- OA TEMP (number 73) is greater than DISABLE TEMP (number 66).

Set DISABLE TEMP to the desired value.

When FBP.2PSVCTL is set to DISABLE and OA TEMP is less than ENABLE TEMP (number 65), the 2 position heating valve will remain opened throughout the entire heating mode.

Set ENABLE TEMP to the desired value.

Set the relative humidity HI and LO limits

Set RH HI LIMIT (number 83) to the highest relative humidity desired before dehumidification is used.

Set RH LO LIMIT (number 84) to the lowest relative humidity desired before dehumidification is shut off.

Set the free cooling HI and LO limits

Set UPPER LIMIT (number 97) to the desired value. (When OA TEMP (number 73) is greater than UPPER LIMIT, FREE CLG (number 23) is disabled.)

Set LOWER LIMIT to the desired value. (When OA TEMP is less than LOWER LIMIT (number 96), FREE CLG is enabled.)

Set the day cooling room temperature set point

If desired, applications 2348 and 2349 can automatically adjust the DAY CLG STPT (number 6) based on the value of OA TEMP (number 73). Follow these steps to make this happen:

1. Set the points MIN CLG STPT (number 56) and MAX CLG STPT (number 57) to the minimum and maximum day cooling room set point values, respectively.
2. Set the point MIN OA TEMP (number 74) to the desired value. (When OA TEMP equals MIN OA TEMP, DAY CLG STPT equals MIN CLG STPT.)
3. Set the point MAX OA TEMP (number 75) to the desired value. (When OA TEMP equals MAX OA TEMP, DAY CLG STPT equals MAX CLG STPT.)

Set the LTDT contact value

The TEC needs to know whether or not the low temperature detector is Normally Closed or Normally Opened. If it is Normally Closed, then set the point LTDT CONTACT (point 28) to NCLOSE. If it is Normally Opened, then set the point LTDT CONTACT to NOPEN.

If a low temperature detector is not being used, then set the point LTDT CONTACT to NOPEN.

Set room temperature set points

Follow these steps to set the room temperature set points:

1. Display the STARTUP report.
2. If the room temperature sensor has a set point dial, and if the point RM STPT DIAL (number 13) is to be used by the controller, then set the point STPT DIAL (number 14) to YES; otherwise, set STPT DIAL to NO.

NOTE: If STPT DIAL is set to YES, then the points DAY HTG STPT (number 7) and DAY CLG STPT (number 6) will not be used. Instead, the value of RM STPT DIAL will be used.

If there is no set point dial on the room temperature sensor, then verify that STPT DIAL is set to NO.

3. Display the SETPOINTS report:

Set the following points to the appropriate values:

- DAY CLG STPT (number 6)
 - DAY HTG STPT (number 7)
 - NGT CLG STPT (number 8)
 - NGT HTG STPT (number 9)
4. If the room temperature sensor has a set point dial and the set point dial is to be used, then set the points RM STPT MIN (number 11) and RM STPT MAX (number 12) for the minimum and the maximum allowable room temperature set point values, respectively. Valid values range from 55° to 95°F (13° to 35°C). Common values for these points are 65°F (18°C) for RM STPT MIN and 80°F (27°C) for RM STPT MAX.

Set outdoor air damper minimum position

Follow these steps to set the outdoor air damper minimum position:

1. Display the STARTUP report.
2. If the desired minimum position for the outdoor air damper is a value other than the default value of 14.8%, then set the point OADPR MINPOS (number 10) to the desired value.

Set valve configuration

Application 2348: If the unit has 1 valve that controls a coil that changes from heating to cooling depending on the season (a 2-pipe heat/cool configuration), then set the point 1 VLV HTGCLG (number 16) to YES.

For all other units, leave 1 VLV HTGCLG at its default value of NO.

Enable auxiliary radiation

If the unit has auxiliary radiation that will be controlled by DO 1, then set the point AUX.NOAUX (number 22) to AUX.

For all other units, leave AUX.NOAUX at its default value of NOAUX.

Enable face-bypass damper

Application 2348: If the unit has a face-bypass damper, then set the point FBP.MODVALVE (number 17) to FBP.

For all other units, leave FBP.MODVALVE at its default value of VALVE.

Set override time

If using night override, then set the point OVRD TIME (number 20) to the number of whole hours an override should last.

Otherwise, leave OVRD TIME at its default value of 1 (night override is disabled).

Set start and span of voltages for the 0-10V actuators

Depending on the actuators you are using, set the points listed in Table 2 to the appropriate starting voltage position and the voltage range for the actuators.

NOTE: The maximum voltage output for the AOs is 10V. Therefore, the starting voltages and the voltage ranges **must not** exceed 10V. The controller **will not** control the valve or damper actuator beyond 10V.

Table 2. Start and Span Voltages for Actuators.

Descriptor	Point Number	Siemens Building Technologies P/N SQB 61.1	Barber-Coleman P/N MP5433
		Voltage Range	
AOV1 SPAN	31	10 (default)	3
AOV2 SPAN	33		
AOV3 SPAN	35		
		Starting Voltage	
AOV1 START	32	0 (default)	6
AOV2 START	34		
AOV3 START	36		

Set AO DIR.REV

If the normal (de-energized) state of all of the devices controlled by AOs is direct acting, then leave the point AO DIR.REV (number 37) at its default value of 0.

Otherwise, reverse the action of the appropriate AO, or combination of AOs, as follows:

1. Add the values in Table 3 for each AO you wish to make reverse acting.
2. Set AO DIR.REV to this value.

Table 3. AO DIR.REV Values.

Reverse-Acting AO	Value
AO1	1
AO2	2
AO3	4

Enable night heating

If using hot water heat, then leave the point NGT HW HTG (number 87) at its default position of YES, which will open the hot water valve during night mode.

If using steam or electric heat, then set NGT HW HTG to NO.

Enable night cooling

If cooling is desired during night mode, then set the point NGT CLG MODE (number 53) to YES.

NOTE: For cooling only units, NGT CLG MODE **must** be set to YES to enable cooling in the night mode.

Otherwise, leave NGT CLG MODE at its default value of NO.

Set DO DIR.REV

If the normal (de-energized) state of all of the devices controlled by DOs is direct acting, then leave the point DO DIR.REV (number 59) at its default value of 0.

Otherwise, reverse the action of the devices as follows:

1. Add the values in Table 4 for each DO you wish to make reverse acting.
2. Set DO DIR.REV to this value.

Table 4. DO DIR.REV Values.

Reverse-Acting DO	Value
DO1	32
DO2	16
DO3	8
DO4	4
DO5	2
DO6	1
DO7	64
DO8	128

Set gains

Display the TUNING report. Set the P, I, and D gains for the system. Refer to Table 5.

Table 5. Recommended P, I, and D Gains for Applications 2348 and 2349.

Hardware Configuration	Cooling Loop	Heating Loop	Room Loop
	62 CLG P GAIN	67 HTG P GAIN	70 ROOM P GAIN
	63 CLG I GAIN	68 HTG I GAIN	71 ROOM I GAIN
	64 CLG D GAIN	69 HTG D GAIN	72 ROOM D GAIN
VALVES			
Steam	Does not apply.	0.4 (0.72) 0.015 (0.027) 5 (9)	2.3 (4.14) 0.00504 (0.009072) 76 (136.8)
HW	Does not apply.	0.06 (1.08) 0.02 (0.036) 15 (27)	2.3 (4.14) 0.00504 (0.009072) 76 (136.8)
CHW	1.6 (2.88) 0.05 (0.09) 10 (18)	Does not apply.	2.3 (4.14) 0.00504 (0.009072) 76 (136.8)
DAMPERS			
FBP Steam	Does not apply.	0.3 (0.54) 0.02 (0.036) 0	2.3 (4.14) 0.00504 (0.009072) 76 (136.8)
FBP HW	Does not apply.	0.5 (0.9) 0.03 (0.054) 0	2.3 (4.14) 0.00504 (0.009072) 76 (136.8)
FBP CHW	0.6 (1.08) 0.04 (0.072) 0	Does not apply.	2.3 (4.14) 0.00504 (0.009072) 76 (136.8)

NOTE: Update each controller at the field panel immediately after you have completed the controller start-up procedures, and have made all other changes to the controller's point database (including tuning, etc.).

Unit Vent Controller with Free Cooling, Night Purge and Dehumidification – 0-10V Output start-up is complete.